



INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference GB020037		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/00667		International filing date (day/month/year) 14.02.2003	Priority date (day/month/year) 24.04.2002
International Patent Classification (IPC) or both national classification and IPC H02G1/08			
Applicant INTERNATIONAL BUSINESS MACHINES CORPORATION et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 4 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input checked="" type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 10 APRIL 2003		Date of completion of this report 05.07.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Lommel, A Telephone No. +31 70 340-2502 	

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I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1, 4-7 as originally filed
2, 3, 3a received on 16.04.2004 with letter of 16.04.2004

Claims, Numbers

1-8 received on 16.04.2004 with letter of 16.04.2004

Drawings, Sheets

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.
☐ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☐ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-8
	No: Claims	
Inventive step (IS)	Yes: Claims	1-8
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: DE 42 03 093 A

D2: US 3 166 810 A

1. Novelty

Claims 1-6:

The device for gripping a cable, comprising an elongated housing for slidably receiving the cable axially thereof and having a central bore as specified in claim 1, differs from the closest prior art disclosed according to the document DE 42 03 093 A (D1) by the provision of an aperture in a side of the housing allowing the cable to leave the housing, which further includes means for securing at least the part of the cable, under loop shape, received back by the housing, which housing has a head and said means for securing the cable loop comprises a first lock piece for temporarily holding the cable loop against the head and a second lock piece for securing the first lock piece against said cable loop.

The subject-matter of claim 1 is therefore new in respect of the closest prior art as defined in the Regulations (Rule 64(1)-(3) PCT).

The subject-matter of claims 2-6, which are dependent on claim 1, is, thus, considered to be new.

Hence, the application fulfils the criterion set forth in Article 33(2) PCT.

2. Inventive Step

Claims 1-6:

The distinguishing combination of features of claim 1, viz. an aperture in a side of the housing allowing the cable to leave the housing, which further includes means for securing at least the part of the cable, under loop shape, received back by the housing, which housing has a head and said means for securing the cable loop comprises a first lock piece for temporarily holding the cable loop against the head and a second lock

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piece for securing the first lock piece against said cable loop, constitutes the solution to the problem of how to conceive a cable gripping device by using a cable loop as an attachment means, while reducing the number of parts that need to be supplied with the device resulting in a manufacturing cost reduction.

The prior art does not contain any hint leading to said solution.

The subject-matter of claim 1 is, thus, to be considered to involve an inventive step.

The subject-matter of claims 2-6, which are dependent on claim 1, is also considered to involve an inventive step.

Hence, the application fulfils the criterion set forth in Article 33(3) PCT.

3. Industrial Applicability

The subject-matter of claim 1 relates to a device for gripping a cable; consequently, it is susceptible of industrial application (Article 33(4) PCT).

4. Novelty and inventive step in respect of claims 7 and 8:

Document US 3 166 810 A (D2), which may be considered as the most relevant prior art, discloses a device for pulling a plurality of cables, from which the subject-matter of claim 7 differs by the provision of a first central attachment device and an even number of further attachment devices symmetrically surrounding the central device, wherein each attachment device is freely rotatable about an axis normal to the device base. This difference is the solution to the problem of how to avoid damage to the cable during installation process as a result of twisting of the cable and displacement of internal cable conductors.

There is no disclosure nor suggestion in the prior art for the solution proposed.

The subject-matter of claim 7 is considered to be both novel and involving an inventive step.

In respect of claim 7 and of dependent claim 8 the criteria set forth in Articles 33(2) and (3) PCT are therefore fulfilled.

5. The subject-matter of claim 7 relates to a device for pulling a plurality of cables, and is, consequently, susceptible of industrial application (Article 33(4) PCT).

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Remark

Lack of unity of invention (Rule 13 PCT).

Claims 1-6 relate to a cable gripping device, comprising an elongated housing configured to form a cable loop.

Claims 7 and 8 relate to a device for pulling a plurality of cables, comprising a base and freely rotatable cable attachment devices.

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The use of a pulling sock is not suitable for gripping these new cables for a number of reasons. Current pulling socks are designed for much thicker cables and it is physically difficult to make them small enough to grip the newer type of cable securely. Further, the length of the cable gripped by the pulling sock has to be thrown away. This is because, the gripping action of the sock is likely to have displaced the conductors within the cabling sheath and thus this part of the cable cannot be relied upon to work properly.

Further, the pulling sock is required to be relatively long in order to achieve a sufficient clamping force on the cable. This is because the sock's steel lattice only tightens around the cable as it is pulled. If the sock was any shorter, the cable might well have been pulled out of the sock before the steel lattice had a chance to grip it properly. The length of the pulling sock means that a large amount of cable is wasted.

WO 00/60714 discloses a device for connecting a wire or cable enabling the traction thereof. This device comprises a ring provided with one or several longitudinal grooves, an end piece provided with the same number of longitudinal grooves as in the ring and designed to fit inside said ring, whereby the longitudinal grooves in the end piece and the ring, when they are located opposite each other, form at least one housing that is adapted to the section of each wire, means (preferably by screwing) that lock the end piece inside the ring in an angular locking position where the corresponding grooves are offset in relation to the others, and protruding elements (threads on the inner side of the ring for example) that are adapted to grasp each wire of the cable in said locking position. This device can be used for drawing wires or electric cables in ducts or casings.

DE 42 03 093 discloses a tool for pulling and drawing cable through a trough or channel and is able to grip the end of a wire loop around a cylindrical element which can rotate and slide within a slot

US 3,166,810 discloses a device for drawing or pulling electric cable through tubular conduits or the like. The device has a cylindrical body with a plurality of boxes for receiving wire strands therein which are then secured with set-screws.

Summary of the Invention

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Accordingly, the invention provides a device for gripping a cable, comprising an elongated housing for slidably receiving the cable axially thereof, the housing having a central bore along which the cable can pass, and an aperture which opens in at least one side of the housing thereby enabling the end of the cable to leave the housing through such aperture, the housing further being configured such that the cable can be received back by the housing to form a loop, the device further including means for securing at least the part of the cable received back by the housing, wherein the housing has a head, and said means for securing the cable loop comprises a first lock piece for temporarily holding the cable loop against the head and a second lock piece for securing the first lock piece against the cable loop.

The device is intended to be used in place of the prior art pulling sock shown in figure 1. The prior art pulling sock has a loop which permits it to be attached to a pulling fuse or similar device. The device of WO 00/60714 also has a cavity in the device's head which permits its fixing with a means of traction. The gripping device of the present invention is not supplied with a loop or other means of traction. Instead the cable itself is used to form a loop by which the cable can be attached to the pulling fuse or similar device. (Of course, the gripping device could be attached directly to a handle or a pulling rope, but this would risk the installers inadvertently over stretching the cable and thereby damaging it).

Using the cable loop as an attachment means is particularly advantageous. This reduces the number of parts that need to be supplied with the device and therefore reduces manufacturing costs.

A further aspect of the invention will now be described. It is important when multiple cables are pulled that a symmetrical pulling force is exerted and that the tension on each cable is substantially identical. This is because, as previously mentioned, the cables are likely to be damaged if over stretched. Therefore a pulling fuse or similar device is used which will break if a predetermined force is applied during the pulling process and thus prevent the application of an excessive force. In order to ensure that the device severs at the correct point in time, the force applied is required to be a symmetrical one.

In a further aspect, the invention provides a device for pulling a plurality of cables, comprising a base and means for attaching each of the plurality of cables to the base, the attachment means comprising a first

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central attachment device and an even number of further attachment devices symmetrically surrounding the central device, wherein each attachment device is freely rotatable about an axis normal to the base.

Cable has a memory and can become twisted during the installation process. This can slow the process and can potentially lead to damage to the cable due to displacement of the internal conductors. This is the reason that each attachment means is freely rotatable about the base and thus can move with the cable. Preferably each attachment means comprises a quick-release loop to make their use as easy as possible.

In a yet further aspect, the invention provides a device for pulling substantially as herein before described with reference to figures 3a, 3b and 3c.

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CLAIMS

1. A device for gripping a cable, comprising an elongated housing for slidably receiving the cable axially thereof, the housing having a central bore along which the cable can pass, and an aperture which opens in at least one side of the housing thereby enabling the end of the cable to leave the housing through such aperture, the housing further being configured such that the cable can be received back by the housing to form a loop, the device further including means for securing at least the part of the cable received back by the housing, wherein the housing has a head, and said means for securing the cable loop comprises a first lock piece for temporarily holding the cable loop against the head and a second lock piece for securing the first lock piece against the cable loop.
2. The device of claim 1, wherein the housing is tubular.
3. The device of claim 1 or 2, wherein the housing has a recess in the side of the housing opposite the aperture opening, the end of the cable being received in such recess.
4. The device of claim 1 or 2, wherein the aperture extends fully across the width of the housing to open in the opposite sides of the housing, the cable leaving the housing through one end of the aperture and being received back by the housing through the other end of the aperture.
5. The device of any preceding claim, wherein the ceiling of the aperture is slanted to guide the cable out through the aperture.
6. The device of any preceding claim further comprising a biasing means for biasing the first lock piece towards the head.
7. A device for pulling a plurality of cables, comprising a base and means for attaching each of the plurality of cables to the base, the attachment means comprising a first central attachment device and an even number of further attachment devices symmetrically surrounding the central device, wherein each attachment device is freely rotatable about an axis normal to the base.
8. The device of claim 8, wherein each attachment device comprises a quick-release loop.